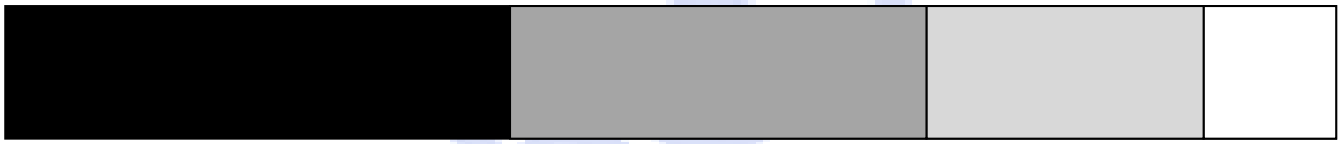
Robostar Robot

# RcT Series Alarm Code Manual

(RcT-1.01.07)



- ☐ Controller Manual
- ☐ Operation Manual
- ☐ Programming Manual
- ☐ Unihost Manual
- ☐ Alarm Code Manual

Specifications are subject to change without prior notice.

# About Warranty

The products of Robostar are manufactured under thorough quality control, and the term of guarantee of all products of Robostar is one year from production date. Only for machine failure due to Robostar's fault or failure occurred due to design and production during normal use within the term of guarantee, Robostar will provide after sales service free of charge.

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(6) Failure due to using up of consumable parts
(7) Failure occurred by not observing maintenance details stipulated in the instruction manual
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# Configuration of Instruction Manual

The instruction manual of this product consists of the following. The first user of this product must be well aware of all contents of this manual before use.

- **Controller Manual**

  Describes general details of the controller such as controller overview, installation and how to interface with an external device.

- **Operation Manual**

  Describes overall methods of controller use as well as parameter setup, JOB program editing and robot operation.

- **Programming Manual**

  Describes a Robostar robot program, RRL (Robostar Robot Language), and how to write robot program by RRL.

- **Unihost Manual**

  Describes 'Unihost' that is a Robostar online PC program.

- **Alarm Code Manual**

  Describes alarm code.

- **Additional Function Manual**

  Describes additional functions of the relevant firmware version.

# Manual Configuration

The manual consists of the followings.

■ **Chapter 1 Configuration of controller alarm code**

Describes many alarms occurs while using the controller

■ **Chapter 2 Controller alarm code table**

Describes alarm code details displayed on the Pendant and measures

# Table of Contents

# Overview

## ➢ Configuration of controller alarm code

- **Describes many alarms which can occur while using the controller.**

- **Alarm Code Display**
  Displays 'alarm code' on the teaching pendant screen when controller alarm occurs.

- **Alarm Message Display**
  Displays details of 'alarm message' displayed on the teaching pendant.

- **Secondary type message**

| Type | Detail | Example |
|---|---|---|
| ROBOT: ⓐ AXIS: ⓑ | Alarm occurred on ⓑ axis of No ⓐ robot | ROBOT:1: AXIS:1 alarm occurred on No 1 axis of No 1 robot |

※ There can be no secondary message according to alarm state.

- **Alarm Level Display**

| Level | Detail |
|---|---|
| 1 | Alarm which released by Reset key after taking measures against alarm |
| 2 | Alarm which needs power re-input |
| 3 | Alarm which needs replacement of device |

## ➢ Controller Alarm Code Table

- Describes alarm code detail displayed on the Pendant and measures

- File System (1001~)
- Device (1051~)
- Protection (1101~)
- Run Time (1201~)
- Compile (1301~)
- Trajectory (1401~)
- Emergency (2101~)
- Servo Driver (4001~)
- EtherCAT Communication (4501~)

## ■ File System

| Code | 1003 | Message | Out of Memory | | |
|---|---|---|---|---|---|
| Description | Prevention of memory allocation error | | | Level | 2 |
| Cause | | | Measures | | |
| ■ Memory allocation failed in the program inside the controller. | | | ■ Check alarm release after turning controller power OFF => ON<br>- In case of continuous occurrence,<br>1. Reinstall RAM on the motherboard<br>2. Replace RAM on the motherboard | | |

| Code | 1021 | Message | Job step info error | | |
|---|---|---|---|---|---|
| Description | | | | Level | 1 |
| Cause | | | Measures | | |
| ■ Actual JOB step differs from recorded JOB step when it is loaded to the memory to execute JOB. | | | ■ Press "RST" button to release the alarm.<br>■ Re-write JOB after checking JOB step at which error occurs. | | |

## ■ Device

| Code | 1073 | Message | Ext-IO Protocol err | | |
|---|---|---|---|---|---|
| Description | EXT- DIO board communication error | | | Level | 1 |
| Cause | | | Measures | | |
| ■ Data received onto the EXT-DIO board are not correct. | | | ■ Press "RST" button to release the alarm.<br>- In case of continuous occurrence,<br>1. Check installation status of EXT-DIO, DIO board and harness.<br>2. Replace EXT-DIO board. | | |

| Code | 1074 | Message | Extend IO Data error | | |
|---|---|---|---|---|---|
| Description | EXT- DIO board communication Data error | | | Level | 1 |
| Cause | | | Measures | | |
| ■ Output data transmitted from the controller differs from output data transmitted from EXT-D IO. | | | ■ Press "RST" button to release the alarm.<br>- In case of continuous occurrence,<br>1. Check harness connected to EXT-DIO board and DIO board;<br>2. Replace EXT-DIO board. | | |

| Code | 1075 | Message | Extend IO Fuse error | | |
|---|---|---|---|---|---|
| Description | EXT-DIO over current protection | | | Level | 3 |
| Cause | | | Measures | | |
| ■ Occurs when FUSE on the EXT-DIO board blows. | | | ■ Replace Fuse on the EXT-DIO board.<br>- In case of continuous occurrence,<br>1. Check device and harness connected to EXT-DIO board. | | |

| Code | 1091 | Message | FAN error | | |
|---|---|---|---|---|---|
| Description | FAN error | | | Level | 1 |
| Cause | | | Measures | | |
| ■ FAN error<br>■ FAN cable error | | | ■ Press "RST" button to release the alarm.<br>- In case of continuous occurrence,<br>1. Check THE FAN<br>2. Check state of FAN Connector contact on the Safety Board.<br>3. REPLACE THE FAN | | |

## ■ Protection

| Code | 1177 | Message | MC ON error | |
|---|---|---|---|---|
| Description | MC (Magnetic Contact) contact state error | | Level | 1 |
| **Cause** | | **Measures** | | |
| ■ Occurs when MC contacts (ON) when the controller is in emergency stop state. (MC must be OFF in alarm state.) | | ■ Press "RST" button to release the alarm.<br>- In case of continuous occurrence,<br>1. Check MC wiring cable<br>2. Replace THE MC.<br>3. Replace the Safety board. | | |

| Code | 1178 | Message | MC OFF error | |
|---|---|---|---|---|
| Description | MC (Magnetic Contact) contact state error | | Level | 1 |
| **Cause** | | **Measures** | | |
| ■ Occurs when MC contacts (ON) when the controller is in emergency stop state. (MC must be OFF in alarm state.) | | ■ Press "RST" button to release the alarm.<br>- In case of continuous occurrence,<br>1. Check MC wiring cable.<br>2. Replace THE MC.<br>3. Replace the Safety board. | | |

| Code | 1184 | Message | H/W P-Limit error | ROBOT: ⓐ AXIS: ⓑ |
|---|---|---|---|---|
| Description | Limit sensor detection | | Level | 1 |
| **Cause** | | **Measures** | | |
| ■ Limit sensor is detected. | | ■ Move robot position to avoid detection of Limit sensor and press "RST" button to release the alarm.<br>- In case of continuous occurrence,<br>1. Check wiring cable and DIO board of the Limit sensor.<br>2. Replace sensor. | | |

| Code | 1185 | Message | H/W N-Limit error | ROBOT: ⓐ AXIS: ⓑ |
|---|---|---|---|---|
| Description | Limit sensor detection | | Level | 1 |
| **Cause** | | **Measures** | | |
| ■ Limit sensor is detected. | | ■ Move robot position to avoid detection of Limit sensor and press "RST" button to release the alarm.<br>- In case of continuous occurrence,<br>1. Check wiring cable and DIO board of the Limit sensor.<br>2. Replace sensor. | | |

| Code | 1186 | Message | In range error | ROBOT: ⓐ AXIS: ⓑ |
|---|---|---|---|---|
| Description | IN RANGE EXCESS | | Level | 1 |

| Cause | Measures |
|---|---|
| ■ Axis position exceeded IN RANGE setting range. | ■ Check if current robot position is within INRANGE range and move to satisfy allowable range.<br>■ Press "RST" button to release the alarm.<br>■ Adjust teaching point of the relevant axis.<br>■ Adjust IN RANGE. |

| Code | 1187 | Message | Use range error | ROBOT: ⓐ AXIS: ⓑ |
|---|---|---|---|---|
| Description | USE RANGE EXCESS | | Level | 1 |

| Cause | Measures |
|---|---|
| ■ USE RNAGE setting range is exceeded when USE RANGE is used. | ■ Check if current robot position is within INRANGE range and move to satisfy allowable range.<br>■ Press "RST" button to release the alarm.<br>■ Adjust teaching point of the relevant axis.<br>■ Adjust IN RANGE.<br>■ Adjust USE RANGE. |

## ■ Run Time

| Code | 1204 | Message | Not Teaching Point ROBOT: ⓐ | |
|---|---|---|---|---|
| Description | Use of point for which teaching is not conducted | | Level | 1 |
| **Cause** | | **Measures** | | |
| ■ Point for which teaching is not conducted is used during use of robot move related command. | | ■ Press "RST" button to release the alarm.<br>■ Check use of point for which teaching is not conducted or teaching state of used point in JOB program.<br>■ Conduct point teaching referring to the operation manual. | | |

| Code | 1219 | Message | Range Over error ROBOT: ⓐ AXIS: ⓑ | |
|---|---|---|---|---|
| Description | Teaching point exceeded allowable range | | Level | 1 |
| **Cause** | | **Measures** | | |
| ■ Value of point for which teaching is conducted got away from the setting range<br>■ System parameter (RANGE) setting is not proper. | | ■ Press "RST" button to release the alarm.<br>■ Check if value of point for which teaching is conducted is within the setting range.<br>■ Correct system parameter (RANGE). | | |

| Code | 1236 | Message | Interpreter error | |
|---|---|---|---|---|
| Description | JOB program execution error | | Level | 1 |
| **Cause** | | **Measures** | | |
| ■ Controller can't understand while running robot command program or wrong operation is tried to be operated. | | ■ Press "RST" button to release the alarm.<br>■ Check Line Number and detailed message to take measure and then retry. | | |

## ■ Compile

| Code | 1315 | Message | Compile error | | |
|---|---|---|---|---|---|
| Description | JOB program Compile error | | | Level | 1 |
| Cause | | | Measures | | |
| ■ The controller can't understand robot command program written by a user or writing of command program is wrong. | | | ■ Press "RST" button to release the alarm.<br>■ Check Line Number and detailed message to take measure and then retry. | | |

## ■ Trajectory

| Code | 1422 | Message | Time Sched. Error | ROBOT: ⓐ AXIS: ⓑ |
|---|---|---|---|---|
| Description | Failure of motion command time schedule | | Level | 1 |
| Cause | | Measures | | |
| ■ PTP motion (JMOV) Time Schedule failed. | | ■ Check Motion Parameter.<br>■ If VEL, ACC command is used, check setting value.<br>■ Press "RST" button to release the alarm. | | |

| Code | 1423 | Message | Over Range Error | ROBOT: ⓐ AXIS: ⓑ |
|---|---|---|---|---|
| Description | position command exceeded RANG (SW-Limit) setting range | | Level | 1 |
| Cause | | Measures | | |
| ■ Axis move position exceeded allowable range.<br>■ Teaching point is within allowable range, but moving path exceeded allowable range. | | ■ Check if current robot position is within allowable range. If it exceeded allowable range, move to satisfy allowable range.<br>■ Press "RST" button to release the alarm.<br>■ Adjust teaching point of the relevant axis<br>■ If FOS command is used, lower FOS setting value. | | |

| Code | 1424 | Message | Over Velocity Error | ROBOT: ⓐ AXIS: ⓑ |
|---|---|---|---|---|
| Description | Allowable velocity command range is exceeded | | Level | 1 |
| Cause | | Measures | | |
| ■ Moving velocity of axis exceeded allowable range.<br>■ Velocity of Linear motion is within allowable range, but moving velocity of each axis exceeded allowable range. | | ■ Adjust velocity setting of the relevant axis.<br>■ Press "RST" button to release the alarm. | | |

| Code | 1425 | Message | Over Accel Error | ROBOT: ⓐ AXIS: ⓑ |
|---|---|---|---|---|
| Description | allowable acceleration command range is exceeded | | Level | 1 |
| Cause | | Measures | | |
| ■ Moving acceleration of axis exceeded allowable range.<br>■ Acceleration of Linear motion is within allowable range, but moving acceleration of each axis exceeded allowable range. | | ■ Adjust acceleration setting of the relevant axis.<br>■ Press "RST" button to release the alarm. | | |

| Code | 1426 | Message | Inposition error | ROBOT: ⓐ AXIS: ⓑ |
|---|---|---|---|---|
| Description | allowable position error range is exceeded | | Level | 1 |
| Cause | | Measures | | |
| ■ Motor can't satisfy allowable range (IPA) within allowable time (IPE) after completing motion | | ■ Press "RST" button to release the alarm.<br>■ check INPOS related parameter setting value. | | |

| | |
|---|---|
| command (JMOV, etc.) run. | - Increase allowable time (IPE) and allowable range (IPA)<br>- If the error continuously occurs even after adjusting IPE, IPA, check robot state and adjust GAIN. |

| Code | 1427 | Message | TG TimeOut error | |
|---|---|---|---|---|
| Description | Position command calculation time is exceeded | | Level | 1 |
| **Cause** | | **Measures** | | |
| ■ Position command calculation time exceeded limited time. | | ■ Press "RST" button to release the alarm. | | |

| Code | 1428 | Message | TG Mode error | |
|---|---|---|---|---|
| Description | Trajectory mode conversion violation | | Level | 1 |
| **Cause** | | **Measures** | | |
| ■ Tried to convert into Parameter Edit Screen in Servo ON maintenance state. | | ■ Press "RST" button to release the alarm.<br>■ convert into Parameter Edit Screen after checking Servo OFF state, | | |

| Code | 1429 | Message | ENC Count error ROBOT: ⓐ AXIS: ⓑ | |
|---|---|---|---|---|
| Description | Feedback Pulse variation allowable range is exceeded | | Level | 1 |
| **Cause** | | **Measures** | | |
| ■ Variation of encoder data input from Servo for each regular cycle exceeded allowable range.<br>■ Multi Turn Clear is conducted. | | ■ Press "RST" button to release the alarm.<br>-In case of continuous occurrence, check and replace encoder harness, Servo Board. | | |

| Code | 1430 | Message | REF Count error ROBOT: ⓐ AXIS: ⓑ | |
|---|---|---|---|---|
| Description | Allowable Reference Pulse variation range is exceeded | | Level | 1 |
| **Cause** | | **Measures** | | |
| ■ Variation of encoder data input from Servo for each regular cycle exceeded allowable range.<br>■ If power is not reset after changing axis information in parameter. | | ■ Press "RST" button to release the alarm.<br>-In case of continuous occurrence,<br>Check alarm release after turning controller power OFF => ON. | | |

| Code | 1431 | Message | Servo ON/OFF TimeOut ROBOT: ⓐ | |
|---|---|---|---|---|
| Description | Servo state mismatch | | Level | 1 |
| **Cause** | | **Measures** | | |
| ■ Number of use axis does not match with number of axis which is in Servo On status<br>■ Number of use axis does not match with number of axis which is in Servo Off status | | ■ Press "RST" button to release the alarm.<br>-In case of continuous occurrence, check motor, Driver and cable | | |

## ■ Emergency

| Code | 2101 | Message | T/P emergency | | |
|---|---|---|---|---|---|
| Description | T/P emergency | | | Level | 1 |
| **Cause** | | | **Measures** | | |
| ■ Emergency switch on T/P is pressed.<br>■ T/P is connected again to the controller after separating from it. | | | ■ Turn T/P Emergency switch clockwise to release Emergency state and then press "RST" button to release alarm situation.<br>■ If the error occurred when T/P Emergency switch is not pressed, (connection state error) T/P ⇔ Tighten Connector Screws to connect the controller to remove shaking of T/P connector. (T/P ⇔ controller contact error) | | |

| Code | 2102 | Message | Front emergency | | |
|---|---|---|---|---|---|
| Description | Front emergency | | | Level | 1 |
| **Cause** | | | **Measures** | | |
| ■ Press Front Emergency switch of the controller. | | | ■ Turn T/P Emergency switch clockwise to release Emergency state and then press "RST" button to release alarm situation. | | |

| Code | 2103 | Message | System emergency | | |
|---|---|---|---|---|---|
| Description | System emergency | | | Level | 1 |
| **Cause** | | | **Measures** | | |
| ■ Any of 2NC (normal close, 2 contact) of SYSTEM Emergency part is open on Safety Input Connector on the front of the controller. | | | ■ Close 2NC (normal close, 2 contact) of SYSTEM Emergency part on Safety Input Connector on the front of the controller and then press "RST" button to release alarm situation (Connect 2NC short connector of SYSTEM Emergency part and check alarm state release.) | | |

| Code | 2104 | Message | Auto emergency | | |
|---|---|---|---|---|---|
| Description | Auto emergency | | | Level | 1 |
| **Cause** | | | **Measures** | | |
| ■ Ay one 2NC (normal close, 2contact) of AUTO Emergency part of Safety Input Connector on the front of the controller is open.<br>Caution: This occurs only when T/P is in AUTO MODE. | | | ■ Close 2NC (normal close, 2 contact) of AUTO Emergency part on Safety Input Connector on the front of the controller and then press "RST" button to release alarm situation.<br>(Connect 2NC short connector of AUTO Emergency part and check alarm state release.) | | |

| Code | 2105 | Message | Manual emergency | | |
|---|---|---|---|---|---|
| Description | Manual emergency | | | Level | 1 |

| Cause | Measures |
|---|---|
| ■ Any of 2NC (normal close, 2contact) of MANUAL Emergency part on Input Connector on the front of the controller is open.<br>Caution: occurs only when T/P is in MANUAL MODE. | ■ Close 2NC (normal close, 2contact) of MANUAL Emergency part on the Safety Input Connector on the front of the controller and then press "RST" button to release alarm situation (Connect 2NC short connector of MANUAL Emergency part and check alarm state release.) |

| Code | 2106 | Message | Light curtain error | |
|---|---|---|---|---|
| Description | Light curtain error | | Level | 1 |
| Cause | | | Measures | |
| ■ Any of 2NC (normal close, 2 contact) of LIGHT CURTAIN Emergency part on Safety Input Connector on the front of the controller is open. | | | ■ Close 2NC (normal close, 2 contact) of LIGHT CURTAIN Emergency part on Safety Input Connector on the front of the controller and press "RST" button to release alarm situation (Connect 2NC short connector of LIGHT CURTAIN Emergency part and check alarm state release.) | |

| Code | 2107 | Message | Light curtain2 error | |
|---|---|---|---|---|
| Description | Light curtain error | | Level | 1 |
| Cause | | | Measures | |
| ■ Any of 2NC (normal close, 2contact) of LIGHT CURTAIN Emergency part on the Safety Input Connector on the front of the controller is open. | | | ■ Close 2NC (normal close, 2 contact) of LIGHT CURTAIN Emergency part on Safety Input Connector on the front of the controller and press "RST" button to release alarm situation (Connect 2NC short connector of LIGHT CURTAIN Emergency part and check alarm state release.) | |

| Code | 2108 | Message | Mode mismatch error | |
|---|---|---|---|---|
| Description | mismatch of the front Mode switch (Auto/Manual) of the controller | | Level | 1 |
| Cause | | | Measures | |
| ■ Mode switch on the front of the controller does not match with contact of T/P mode switch. | | | ■ Match controller mode.<br>■ Press "RST" button to release the alarm. | |

| Code | 2109 | Message | Index mode error | |
|---|---|---|---|---|
| Description | Index Mode (Auto/Manual) mismatch | | Level | 1 |
| Cause | | | Measures | |
| ■ Mode input through Index Mode NC/NO does not match with controller mode. | | | ■ Match Index Mode with controller mode.<br>■ Press "RST" button to release the alarm. | |

| Code | 2110 | Message | External emergency | |
|---|---|---|---|---|
| Description | External emergency | | Level | 1 |
| Cause | | | Measures | |

| | |
|---|---|
| ■ Emergency stop state occurred by F/W or JOB program command in occurrence of controller alarm, Limit IO, Safety IO input situation. | ■ Press "RST" button to release the alarm. |

## ■ Servo Driver

| Code | 4011 | Message | Control PS undervolt | ROBOT: ⓐ AXIS: ⓑ |
|---|---|---|---|---|
| Description | control under voltage protection | | Level | 1 |

| Cause | Measures |
|---|---|
| ■ Voltage between P-N of the converter of the power supply dropped below the designated value.<br>■ Momentary power failure occurred.<br>■ Lack of power capacity. | ■ Press "RST" button to release the alarm.<br>■ Remove the cause of control power drop and then input power<br>- Measure voltage between L1C-L2C |

| Code | 4012 | Message | Over-voltage | ROBOT: ⓐ AXIS: ⓑ |
|---|---|---|---|---|
| Description | overvoltage protection | | Level | 1 |

| Cause | Measures |
|---|---|
| ■ Voltage between P-N of the power supply converter exceeded designated value.<br>■ Power voltage exceeded allowable input voltage.<br>■ Disconnection of regenerative resistor or external-mounting regenerative resistor is improper and absorbs regenerative energy. | ■ Press "RST" button to release the alarm.<br>■ Remove cause of voltage rise and then input power.<br>- Measure voltage between L1, L2 and L3<br>- Measure resistance of regenerative resistor connected between Amp terminal P and B. If value is ∞, replace the regenerative resistor. |

| Code | 4013 | Message | Main PS under voltage | ROBOT: ⓐ AXIS: ⓑ |
|---|---|---|---|---|
| Description | main under voltage protection | | Level | 1 |

| Cause | Measures |
|---|---|
| ■ In case of Pr5.09 (LV travel Selection when main power is OFF) = 1, Pr5.08 (main power OFF detection time) between L1~L3, suddenly stopped than the setting time or voltage between P-N of main power converter dropped below the regulated value during Servo On.<br>■ Power voltage is low. Momentary power failure occurred.<br>■ Lack of power capacity | ■ Press "RST" button to release the alarm.<br>■ Remove cause of voltage drop of electromagnetic contactor of main power and then input power again.<br>- Longer setting of Pr5.08 (main power OFF detection time).<br>- Measure voltage between L1, L2 and L3 |

| Code | 4014 | Message | Over-current | ROBOT: ⓐ AXIS: ⓑ |
|---|---|---|---|---|
| Description | Over current protection, IPM error prevention | | Level | 2 |

| Cause | Measures |
|---|---|
| ■ Current flows on the converter exceeded regulated value.<br>■ Short circuit of motor wire U, V, W<br>■ Motor wire ground error, contact error<br>■ Motor damage by fire | ■ Check alarm release after turning controller power OFF => ON<br>■ Check lead wire of the connector to check for short-circuit of connection U, V, W of motor wire. Correctly connect motor wire. |

| | |
|---|---|
| | ■ Check insulation resistor between U, V, W of motor wire and ground wire of the motor. In case of poor insulation, replace the motor.<br>■ Check resistance balance of each line of the motor. In case of imbalance, replace the motor.<br>■ Check for missing of connector pin on the connecting part U, V, and W of the motor. If loosened or missing, tightly fix it. |

| Code | 4015 | Message | Over-heat | ROBOT: ⓐ AXIS: ⓑ |
|---|---|---|---|---|
| Description | overheating protection | | | Level 2 |

| Cause | Measures |
|---|---|
| ■ Heat sink or temperature of power device exceeded designated temperature.<br>■ Ambient temperature exceeded designated temperature.<br>■ overload | ■ Check alarm release after turning controller power OFF => ON.<br>■ Improve ambient temperature and cooling condition.<br>■ Set accel/deceleration time to be longer and lower load. |

| Code | 4016 | Message | Over-load | ROBOT: ⓐ AXIS: ⓑ |
|---|---|---|---|---|
| Description | Overload protection | | | Level 1 |

| Cause | Measures |
|---|---|
| ■ Torque command value exceeded overload level set to Pr5.12 (overload level setting).<br>■ Load is large and actual torque started for a long time in exceeding status of rated torque.<br>■ Oscillation, hunting operation, vibration, abnormal noise of the motor due to gain adjustment error. Inertia ratio Pr0.04 setting error<br>■ Wiring error, disconnection of the motor<br>■ operated in brake operating status. | ■ Press "RST" button to release the alarm.<br>(It may take more than 10 seconds for alarm release.)<br>■ Set accel/deceleration time to be longer.<br>■ Re-adjust gain.<br>■ Replace the cable.<br>■ Measure voltage of the brake terminal. |

| Code | 4018 | Message | Over-regeneration | ROBOT: ⓐ AXIS: ⓑ |
|---|---|---|---|---|
| Description | Regenerative overload protection | | | Level 2 |

| Cause | Measures |
|---|---|
| ■ Regenerative energy exceeded capacity of the regenerative resistor. | ■ Check alarm release after turning controller power OFF => ON.<br>- If alarm is not released after power re-input, check alarm code marked on 7-Segment of the Driver.<br>If 18.1 are marked, Servo Driver must be replaced. |

| Code | 4021 | Message | Encoder error | ROBOT: ⓐ AXIS: ⓑ |
|---|---|---|---|---|
| Description | Encoder communication error protection | | | Level 2 |

| Cause | Measures |
|---|---|
| ■ Communication between the encoder and Servo driver stopped more than certain time.<br>■ Error detected in the data received from the | ■ Check alarm release after turning controller power OFF => ON.<br>■ If encoder cable and motor cable are bound together, |

| | |
|---|---|
| encoder. | separate and check the cable.<br>- measured voltage value of power supplied to the encoder satisfies normal range DC5V ± 5% (4.75~5.25V). However, if alarm is continuously not released after re-inputting power, there is possibility of failure. |

| Code | 4023 | Message | Encoder data error | ROBOT: ⓐ AXIS: ⓑ |
|---|---|---|---|---|
| Description | Position deviation excess prevention | | Level | 2 |

| Cause | Measures |
|---|---|
| ■ Error detected from the data received from the encoder. | ■ Check alarm release after turning controller power OFF => ON.<br>■ If encoder cable and motor cable are bound together, separate and check the cable.<br>- Measured voltage value of power supplied to the encoder satisfies normal range DC5V ± 5% (4.75~5.25V). However, if alarm is continuously not released after re-inputting power, there is possibility of failure. |

| Code | 4024 | Message | Position deviation | ROBOT: ⓐ AXIS: ⓑ |
|---|---|---|---|---|
| Description | Position deviation excess prevention, velocity deviation excess prevention | | Level | 1 |

| Cause | Measures |
|---|---|
| ■ Deviation pulse exceeded setting of Pr0.14.<br>■ Setting value of Pr0.14 is small<br>■ Difference between internal position command velocity and actual velocity exceeded setting of Pr6.02. | ■ Press "RST" button to release the alarm.<br>■ Set Pr0.14, Pr6.02 to bigger value.<br>■ Check if the motor follows position command pulse. Check if output torque is saturated in the torque monitor. Adjust gain. Set accel/deceleration time to be longer. Lower load and velocity. |

| Code | 4025 | Message | Hybrid deviation | ROBOT: ⓐ AXIS: ⓑ |
|---|---|---|---|---|
| Description | Hybrid deviation excess prevention | | Level | 2 |

| Cause | Measures |
|---|---|
| ■ Load position displayed on external scale and motor position displayed on encoder slipped at full close control larger than setting pulse using Pr7B (setting exceeding hybrid deviation). | ■ Check alarm release after turning controller power OFF => ON.<br>■ Check connection between motor and load.<br>Check connection between external scale and Amp.<br>Check if change of motor position (encoder feedback value) and load position (external scale feedback value) is same mark with that for load move.<br>Check if reversal (Pr3.26) of numerator and denominator (Pr3.24 and Pr3.25) of external scale division and external scale direction are correctly set. |

| Code | 4026 | Message | Over-velocity error | ROBOT: ⓐ AXIS: ⓑ |
|---|---|---|---|---|
| Description | Velocitying prevention | | Level | 1 |

| Cause | Measures |
|---|---|

| | |
|---|---|
| ■ Rotating motor velocity exceeded setting value of Pr5.13.<br>■ Rotating motor velocity exceeded setting value of Pr6.15. | ■ Press "RST" button to release the alarm.<br>■ Do not execute excessive velocity command.<br>Check command pulse input frequency and division/multiplication ratio.<br>Adjust gain when overshoot occurred due to gain adjustment error. |

| Code | 4027 | Message | Absolute clear error | ROBOT: ⓐ AXIS: ⓑ |
|---|---|---|---|---|
| Description | Command pulse input frequency error prevention, electronic gear error prevention | | Level | 1 |

| Cause | Measures |
|---|---|
| ■ Frequency of command pulse input exceeded setting of Pr5.32 by 1.2 times.<br>■ Multiplication and division ratio and electronic gear setting set by number of command pulse per 1 rotation is not proper. | ■ Press "RST" button to release the alarm.<br>■ Check command pulse input for frequency.<br>■ Check setting value of the electronic gear. |

| Code | 4028 | Message | Limit of pulse repla | ROBOT: ⓐ AXIS: ⓑ |
|---|---|---|---|---|
| Description | Protection of pulse regenerative limit | | Level | 1 |

| Cause | Measures |
|---|---|
| ■ Output frequency of pulse regenerative exceeded limit. | ■ Press "RST" button to release the alarm.<br>■ Check setting value of Pr0.11 and Pr5.03.<br>■ Set Pr5.33 to 0 to inactivate detecting function. |

| Code | 4029 | Message | Deviation counter | ROBOT: ⓐ AXIS: ⓑ |
|---|---|---|---|---|
| Description | Prevention of deviation counter overflow | | Level | 1 |

| Cause | Measures |
|---|---|
| ■ Position deviation based on encoder pulse exceeded $2^{29}$ (536870912). | ■ Press "RST" button to release the alarm.<br>■ Check if the motor operates according to position command pulse.<br>■ Check if output torque saturated in the torque monitor.<br>■ Adjust gain. |

| Code | 4030 | Message | Safety detection | ROBOT: ⓐ AXIS: ⓑ |
|---|---|---|---|---|
| Description | Safety input protection | | Level | 1 |

| Cause | Measures |
|---|---|
| ■ One or both of input photo coupler of safety input 1 and 2 is in OFF state. | ■ Press "RST" button to release the alarm.<br>■ Check wiring of safety input 1 and 2 |

| Code | 4033 | Message | Overlaps allocation | ROBOT: ⓐ AXIS: ⓑ |
|---|---|---|---|---|
| Description | I/F input overlap allocation error prevention | | Level | 2 |

| Cause | Measures |
|---|---|
| ■ Input signal (SI1~SI10) or Output signal (SI1~SI4) is not correctly allocated | ■ Check alarm release after turning controller power OFF => ON.<br>■ Allocate correct function to each connector pin |

| Code | 4034 | Message | Software limit | ROBOT: ⓐ AXIS: ⓑ |
|---|---|---|---|---|
| Description | prevention of motor operating range setting error | | Level | 1 |

| Cause | Measures |
|---|---|
| ■ Motor exceeded designated operating range at Pr5.14 when position command is given within the designated input range.<br>■ Gain is not appropriate. | ■ Press "RST" button to release the alarm.<br>■ Check gain and Inertia Ratio.<br>■ Increase setting value of Pr5.14 or set Pr5.14 to 0 to inactivate protection function. |

| Code | 4036 | Message | EEPROM para error | ROBOT: ⓐ AXIS: ⓑ |
|---|---|---|---|---|
| Description | Prevention of EEPROM parameter variable error | | Level | 3 |

| Cause | Measures |
|---|---|
| ■ Data of parameter variable save area are damaged while reading data from EEPROM after power ON. | ■ Set all parameter variables again.<br>■ Check alarm release after turning controller power OFF => ON.<br>■ If error continues, replace the Amp. |

| Code | 4037 | Message | EEPROM chk code error | ROBOT: ⓐ AXIS: ⓑ |
|---|---|---|---|---|
| Description | Prevention of EEPROM check code error | | Level | 3 |

| Cause | Measures |
|---|---|
| ■ Data to input to EEPROM are damaged while reading data from EEPROM after power ON. | ■ Replace the Amp. |

| Code | 4038 | Message | Over-travel inhibit | ROBOT: ⓐ AXIS: ⓑ |
|---|---|---|---|---|
| Description | Prevention of over-travel inhibition input | | Level | 2 |

| Cause | Measures |
|---|---|
| ■ Both of positive and negative over-travel inhibition input (POT/NOT) are ON when Pr5.04, over-travel inhibition input setting = 0.<br>Positive and negative over-travel inhibition input is converted into ON in Pr5.04=0 state. | ■ Check alarm release after turning controller power OFF => ON.<br>■ Check if increasing time of switch, wire or power supply (DC12~24V) connected to forward/backward over-travel inhibition input is slow. |

| Code | 4040 | Message | Absolute cnt over | ROBOT: ⓐ AXIS: ⓑ |
|---|---|---|---|---|
| Description | Protection of absolute system down error | | Level | 1 |

| Cause | Measures |
|---|---|
| ■ Supply power of 17bit absolute encoder and battery power is down and voltage of built-in condenser gets down below the regulated value. | ■ Move robot to origin position and connect power for battery and then conduct Multi Turn Clear for absolute encoder.<br>■ Press "RST" button to release the alarm.<br>- Alarm won't be released before conducting Multi Turn Clear. |

| Code | 4041 | Message | Safety detection | ROBOT: ⓐ AXIS: ⓑ |
|---|---|---|---|---|
| Description | Prevention of absolute counter excess error | | Level | 2 |

| Cause | Measures |
|---|---|

| | |
|---|---|
| ■ Multi Turn counter of 17bit absolute encoder exceeded designated value. | ■ Check alarm release after turning controller power OFF => ON.<br>■ Set Pr0.15 to 2 to ignore Multi Turn counter.<br>■ Limit moving amount from machine origin within 32,767 rotations. |

| Code | 4042 | Message | Absolute over-velocity | ROBOT: ⓐ AXIS: ⓑ |
|---|---|---|---|---|
| Description | Prevention of absolute velocitying error | | Level | 1 |

| Cause | Measures |
|---|---|
| ■ Motor velocity exceeded designated value when only battery power is supplied to 17bit encoder during power failure. | ■ Move robot to origin position and connect power for battery and then conduct Multi Turn Clear for absolute encoder.<br>■ Press "RST" button to release the alarm.<br>- Alarm won't be released before conducting Multi Turn Clear.<br>■ Check supply voltage (5V ± 5%) on the encoder side.<br>■ Check connection state of connector CN X2. |

| Code | 4043 | Message | INC-Encoder init err | ROBOT: ⓐ AXIS: ⓑ |
|---|---|---|---|---|
| Description | Prevention of encoder Initialize error | | Level | 3 |

| Cause | Measures |
|---|---|
| ■ Encoder Initialize error is detected. | ■ Replace the motor. |

| Code | 4044 | Message | Abs s-turn cnt error | ROBOT: ⓐ AXIS: ⓑ |
|---|---|---|---|---|
| Description | Prevention of absolute multi Turn counter error | | Level | 3 |

| Cause | Measures |
|---|---|
| ■ 1 rotation counter error of the encoder is detected. | ■ Replace the motor. |

| Code | 4045 | Message | Abs m-turn cnt error | ROBOT: ⓐ AXIS: ⓑ |
|---|---|---|---|---|
| Description | Prevention of absolute 1 rotation counter error | | Level | 3 |

| Cause | Measures |
|---|---|
| ■ Error of Multi Turn counter of the encoder is detected. | ■ Replace the motor. |

| Code | 4047 | Message | Absolute state err | ROBOT: ⓐ AXIS: ⓑ |
|---|---|---|---|---|
| Description | Prevention of absolute 1 rotation counter error | | Level | 2 |

| Cause | Measures |
|---|---|
| ■ Encoder operates at velocity faster than the designated value after power ON. | ■ Check alarm release after turning controller power OFF => ON.<br>■ Motor is located not to be operated when power is ON. |

| Code | 4048 | Message | INC-Encoder Z-phase | ROBOT: ⓐ AXIS: ⓑ |
|---|---|---|---|---|
| Description | Prevention of encoder Z PHASE error | | Level | 3 |

| Cause | Measures |
|---|---|
| ■ Z PHASE pulse of incremental series encoder is not detected.<br>The encoder maybe failed. | ■ Replace the motor. |

| Code | 4049 | Message | INC-Encoder CS signal | ROBOT: ⓐ AXIS: ⓑ |
|---|---|---|---|---|
| Description | Prevention of encoder CS signal error | | Level | 3 |

| Cause | Measures |
|---|---|
| ■ Logical CS signal error of incremental series encoder is detected.<br>The encoder maybe failed. | ■ Replace the motor. |

| Code | 4050 | Message | Ext-scale connection | ROBOT: ⓐ AXIS: ⓑ |
|---|---|---|---|---|
| Description | Prevention of feedback scale wiring error | | Level | 2 |

| Cause | Measures |
|---|---|
| ■ Communication between external scale and Amp stopped at certain time and separation detection function is triggered.<br>■ Communication error at data received from external scale occurred. Most of data error is due to noise. External scale cable is connected, but communication data error occurred. | ■ Connect wiring of external scale according to wiring diagram.<br>Correctly connect connector pin which is incorrectly wired.<br>■ Secure power supply for DC5V ± 5% (4.75V~5.25V) of external scale. Especially, be cautious if external scale cable is long.<br>■ If external scale cable and motor cable are bound together, separate the two cables from each other.<br>■ Connect shield device to FG. |

| Code | 4051 | Message | Ext-scale comm error | ROBOT: ⓐ AXIS: ⓑ |
|---|---|---|---|---|
| Description | Prevention of external scale state error | | Level | 2 |

| Cause | Measures |
|---|---|
| ■ External scale error code is detected. | ■ Check specification of external scale.<br>■ Clear external scale error.<br>■ Check alarm release after turning controller power OFF => ON. |

| Code | 4055 | Message | A-phase connection | ROBOT: ⓐ AXIS: ⓑ |
|---|---|---|---|---|
| Description | Prevention of external scale A, B, Z PHASE wiring error | | Level | 2 |

| Cause | Measures |
|---|---|
| ■ Error of A, B and Z phase wiring of external scale (Ex: disconnection). | ■ Check wiring connection of A, B AND Z PHASE.<br>■ Check alarm release after turning controller power OFF => ON. |

| Code | 4080 | Message | ESM request error | ROBOT: ⓐ AXIS: ⓑ |
|---|---|---|---|---|
| Description | ESM request error | | Level | 1 |

| Cause | Measures |
|---|---|
| ■ EtherCAT communication state error occurred. | ■ Press "RST" button to release the alarm.<br>If alarm won't be released, turn OFF the controller and then |

| | |
|---|---|
| | back it ON. |

| Code | 4081 | Message | Synchronization err | ROBOT: ⓐ AXIS: ⓑ |
|---|---|---|---|---|
| Description | Synchronization err | | Level | 1 |
| Cause | | | Measures | |
| ■ EtherCAT communication state error occurred. | | | ■ Press "RST" button to release the alarm.<br>If alarm won't be released, turn OFF the controller and then back it ON. | |

| Code | 4084 | Message | Synchronous est init | ROBOT: ⓐ AXIS: ⓑ |
|---|---|---|---|---|
| Description | Synchronous est init | | Level | 2 |
| Cause | | | Measures | |
| ■ An error occurred during communication, Servo Sync, Initialize procedure. | | | ■ Check alarm release after turning controller power OFF => ON. | |

| Code | 4087 | Message | Compulsory err input | ROBOT: ⓐ AXIS: ⓑ |
|---|---|---|---|---|
| Description | Protection of forced alarm input | | Level | 1 |
| Cause | | | Measures | |
| ■ Forced alarm input (E-STOP) is applied. | | | ■ Press "RST" button to release the alarm.<br>■ Check wiring of forced alarm input (E-STOP). | |

| Code | 4088 | Message | Main Power undervolt | ROBOT: ⓐ AXIS: ⓑ |
|---|---|---|---|---|
| Description | Protection of Main Power under voltage | | Level | 2 |
| Cause | | | Measures | |
| ■ Controller power is turned OFF during EtherCAT communication or communication is not available. | | | ■ Check alarm release after turning controller power OFF => ON. | |

| Code | 4091 | Message | Command error | ROBOT: ⓐ AXIS: ⓑ |
|---|---|---|---|---|
| Description | Command error protection | | Level | 1 |
| Cause | | | Measures | |
| ■ Control mode is converted in short time less than 2ms. | | | ■ Press "RST" button to release the alarm.<br>If alarm won't be released, turn OFF the controller and then back it ON. | |

| Code | 4092 | Message | Encoder data recover | ROBOT: ⓐ AXIS: ⓑ |
|---|---|---|---|---|
| Description | protection of Encoder data recover error | | Level | 2 |
| Cause | | | Measures | |
| ■ Internal position data is not correctly Initialized in absolute mode for semi-close control. | | | ■ Check alarm release after turning controller power OFF => ON.<br>■ Secure power supply for DC5V ± 5% (4.75V~5.25V) of external scale. Especially, be cautious if external scale cable is long.<br>If external scale cable and motor cable are bound together, | |

| | |
|---|---|
| | separate two cables from each other.<br>Connect shield device to FG. |

| Code | 4093 | Message | Para setting error | ROBOT: ⓐ AXIS: ⓑ |
|---|---|---|---|---|
| Description | Parameter setup error protection | | Level | 2 |

| Cause | Measures |
|---|---|
| ■ External scale ratio exceeded range value. | ■ Check alarm release after turning controller power OFF => ON.<br>Range value of external scale ratio is 1/40 ~ 160. |

| Code | 4095 | Message | Motor auto-recognition | ROBOT: ⓐ AXIS: ⓑ |
|---|---|---|---|---|
| Description | Prevention of motor auto recognition error | | Level | 3 |

| Cause | Measures |
|---|---|
| ■ The motor does not fit with the Amp. | ■ Replace it with a motor suitable with the Amp. |

| Code | 4098 | Message | Unusual Comm IC init | ROBOT: ⓐ AXIS: ⓑ |
|---|---|---|---|---|
| Description | protection of Unusual communication IC initialization | | Level | 2 |

| Cause | Measures |
|---|---|
| ■ Communication IC Initialize procedure is abnormally conducted. | ■ Check alarm release after turning controller power OFF => ON.<br>If the error continuously occurs, replace motor and Servo Amp. |

## ■ EtherCAT

| Code | 4501 | Message | EtherCAT stop | | |
|---|---|---|---|---|---|
| Description | EtherCAT stop | | | Level | 2 |
| **Cause** | | | **Measures** | | |
| ■ Task for EtherCAT communication is stopped. | | | ■ Check alarm release after turning controller power OFF => ON.<br>- In case of continuous occurrence,<br>1. Check LAN cable connected to Mainboard and Driver.<br>2. check if XML file Selection is proper | | |

| Code | 4502 | Message | EtherCAT Comm fail | | |
|---|---|---|---|---|---|
| Description | EtherCAT Comm fail | | | Level | 1 |
| **Cause** | | | **Measures** | | |
| ■ Communication alarm in reading procedure for Driver state occurred. | | | ■ Press "RST" button to release the alarm.<br>- In case of continuous occurrence,<br>1. Check LAN cable connected to Mainboard and Driver.<br>■ Press "RST" button to release the alarm. It the error is not solved, check alarm release after turning controller power OFF => ON. | | |

## ➢ Revision

| Date | Revision Detail |
|---|---|
| Jan 2016 | Initial distribution |
| | |

# RCQ ROBOT CONTROLLER (Revision)

# CONTROLLER MANUAL

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ROBOSTAR CO, LTD

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# TECHNICAL DOCUMENT

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